

Brett W. Bader

Sandia National Laboratories
P.O. Box 5800
Albuquerque, NM 87185-1318
<http://www.sandia.gov/~bwbader>
bwbader@sandia.gov
(505) 845-0514

Education

- Ph.D. **University of Colorado at Boulder**, Boulder, CO
Computer Science, 2003
Thesis: *A Tensor-Krylov Method for Solving Large-scale Systems of Nonlinear Equations*
Thesis Advisor: Robert B. Schnabel
- M.S. **Massachusetts Institute of Technology**, Cambridge, MA
Chemical Engineering Practice, 1996
- B.S. **Massachusetts Institute of Technology**, Cambridge, MA
Chemical Engineering, minor in Economics, 1995

Research Interests

Overall Interest:

Computational methods from the areas of multilinear algebra, machine learning, and optimization and their application to informatics, data mining, and engineering problems.

Individual Research Interests:

- Algebraic decompositions of tensors (multi-way arrays)
- Text analysis, including algebraic techniques for natural language processing
- Algorithms for graph and link analysis
- Multispectral and hyperspectral image analysis
- Iterative methods for large-scale problems (linear and nonlinear systems; optimization)

Professional Experience

Sandia National Laboratories, Albuquerque, NM 2005 to Present
Senior Member of Technical Staff. Building a research program in informatics and data mining using multi-way data analysis to interpret large text corpora and large-scale semantic graphs arising in cyber traffic and communication data, with an emphasis on temporal analysis. Developing new text analysis techniques for cross-language information retrieval and natural language processing. Other projects include modeling of disinfection processes in water-biofilm systems and greenhouse gas data analysis.

Sandia National Laboratories, Albuquerque, NM Nov. 2009 to June 2010
Interim Department Manager. Managed the Department of Computer Science and Informatics for 7 months. Initiated hiring process for 2 job postings. Frequent customer engagement with briefings to visitors and Sandia management.

Sandia National Laboratories, Albuquerque, NM 2003 to 2005
2003 Von Neumann Postdoctoral Research Fellow. Conducted novel research in informatics and data mining,

integrating multilinear algebra techniques into large-scale web search and clustering. Investigated reduced order methods for use in finite element models for simulation and optimal control. Investigated large-scale implementations of nonlinear solution algorithms. Implemented a robust large-scale tensor method in NOX, Sandia's object-oriented nonlinear equations solver package.

University of Colorado, Boulder, CO 2000 to 2003

Research Assistant. Developed algorithms for solving systems of nonlinear equations toward completion of a Ph.D. thesis. Research was aimed at all aspects of a large-scale nonlinear equations solver that is based on tensor methods, including an efficient solution of the local tensor model using Krylov subspace methods and preconditioning techniques plus a robust global strategy.

Sandia National Laboratories, Albuquerque, NM July-August, 2002

Contractor. Implemented a preliminary large-scale tensor method based on a GMRES linear solver that functions within NOX, Sandia's object-oriented nonlinear solver package. Provided on-site consulting and assistance with Sandia modeling and simulation efforts.

University of Colorado, Boulder, CO 1998 to 2000

Research Assistant – Global Optimization Group. Conducted protein-folding research utilizing *ab initio* methods and global optimization. Developed biasing schemes for beta sheet secondary structure. Participated in the 4th Critical Assessment of Techniques for Protein Structure Prediction (CASP4) competition.

The Dow Chemical Company, Freeport, TX 1996 to 1998 and Summer, 1999

Process Engineer. Modeled ethylene plant with rigorous, nonlinear, steady-state models for use in a closed-loop, real-time optimizer. Implemented optimizer as highest layer in plant control scheme. Numerous side projects involved process flowsheet simulations (Aspen Plus) and dynamic simulation of complex chemical processes (SPEEDUP). Acted as Global Technical Coordinator for SPEEDUP, Aspen Technology's dynamic simulation software, coordinating technical support for Dow employees worldwide and acting as a corporate and technology liaison between Dow and Aspen Technology.

MIT Practice School, West Point, PA and Midland, MI Spring, 1996

Student – Merck Station. Modeled bioreactor using computational fluid dynamics tools. Investigated a novel control scheme that uses signal processing for a tablet granulation process.

Student – Dow Station. Studied and recommended expansion options for a refrigeration system at a batch processing plant. Assessed pressure relief devices in several manufacturing plants.

Merck & Co., Inc., West Point, PA Summer, 1995

Summer Intern – Sterile Operations Technical Services. Investigated alternative control schemes as well as silicone oil deposition during a lyophilization cycle.

Merck & Co., Inc., West Point, PA Summer, 1994

Summer Intern – Bioprocess R&D. Performed process development research on polysaccharide-protein conjugate vaccine. Conducted sensitivity studies on reaction variables important in process scale-up.

Univ. of New Mexico School of Medicine, Albuquerque, NM Summers, 1992 and 1993

Lab Technician. Conducted experiments to study signal transduction for cytotoxicity and chemotaxis in human natural killer (NK) cells.

Teaching

University of New Mexico, Albuquerque, NM Fall, 2009

Part-time Instructor. While still at Sandia, co-taught the introductory graduate-level course on Numerical Analysis in the Department of Mathematics and Statistics.

University of Colorado, Boulder, CO

2000 to 2002

Teaching Assistant. Software engineering methods and tools. (Fall, 2002)

Grader. Numerical computation (at both the graduate and undergraduate level).

Refereed Journal Articles

Peter A. Chew, Brett W. Bader, Stephen Helmreich, Ahmed Abdelali, and Stephen J. Verzi. An information-theoretic, vector-space-model approach to cross-language information retrieval, *Natural Language Engineering* 17 (1): 37–70, January 2011.

Tamara G. Kolda and Brett W. Bader, *Tensor decompositions and applications*, *SIAM Review*, 51(3): 455-500, August, 2009.

Brett W. Bader and Tamara G. Kolda, *Efficient MATLAB computations with sparse and factored tensors*, *SIAM J. Scientific Computing*, 30(1):205-231, December 2007.

Brett W. Bader and Robert B. Schnabel, *On the performance of tensor methods for solving ill-conditioned problems*, *SIAM J. Scientific Computing*, 29(6):2329-2351, October 2007.

Brett W. Bader and Tamara G. Kolda, *Algorithm 862: MATLAB tensor classes for fast algorithm prototyping*, *ACM Transactions on Mathematical Software*, 32(4):635-653, December 2006.

Brett W. Bader, *Tensor-Krylov methods for solving large-scale systems of nonlinear equations*, *SIAM J. Numerical Analysis*, 43(3):1321-1347, 2005.

Elizabeth Eskow, Brett Bader, Richard Byrd, Sylvia Crivelli, Teresa Head-Gordon, Vincent Lamberti, and Robert Schnabel, *An Optimization approach to the problem of protein structure prediction*, *Mathematical Programming*, 101(3):497-514, 2004.

Brett W. Bader and Robert B. Schnabel, *Curvilinear linesearch for tensor methods*, *SIAM J. Scientific Computing* (Copper Mountain special issue), 25:604-622, 2003.

John G. Aunins, Brett Bader, Anthony Caola, Janet Griffiths, Maayan Katz, Peter Licari, Kripa Ram, Colette Ranucci, and Weichang Zhou, *Fluid mechanics, cell distribution, and environment in CellCube bioreactors*, *Biotechnology Progress*, 19(1):2-8, 2003.

Silvia Crivelli, Elizabeth Eskow, Brett Bader, Vincent Lamberti, Richard Byrd, Robert Schnabel, and Teresa Head-Gordon, *A Physical approach to protein structure prediction*, *Biophysical J.*, 82:36-49, 2002.

Margaret M. Whalen, Rashmi N. Doshi, Brett W. Bader, and Arthur D. Bankhurst, *Lysophosphatidylcholine and arachidonic acid are required in the cytotoxic response of human natural killer cells to tumor target cells*, *Cellular Physiology and Biochemistry*, 9(6):297-309, 1999.

Refereed Conference and Workshop Proceedings

Brett W. Bader, W. Philip Kegelmeyer, and Peter A. Chew. Multilingual Sentiment Analysis Using Latent Semantic Indexing and Machine Learning. Submitted to ACL-HLT, 2011.

Bernard Zak, Brett Bader, Ray Bambha, Hope Michelsen, Mark Boslough, and Andy R. Jacobson. *Reduction of Uncertainties in Remote Measurement of Greenhouse Gas Fluxes*, in the IEEE 2010 Aerospace

Conference, Big Sky, MT, 2010.

Peter Chew, Brett Bader, and Alla Rozovskaya, *Using DEDICOM for Completely Unsupervised Part-of-Speech Tagging*, in Proceedings of North American Association of Computational Linguistics, Human Language Technologies (NAACL-HLT) Workshop on Unsupervised and Minimally Supervised Learning of Lexical Semantics, 2009.

Brett Bader, Andrey Puretskiy, and Michael Berry, *Scenario detection using nonnegative tensor factorization*, invited paper to The 13th Iberoamerican Congress on Pattern Recognition (CIARP) 2008.

Brett Bader and Peter Chew, *Enhancing multilingual latent semantic analysis with term alignment information*, in The 22nd Int. Conf. on Computational Linguistics (COLING) 2008.

Peter Chew, Brett Bader, and Amed Abdelali, *Latent morpho-semantic analysis: multilingual information retrieval with character n-grams and mutual information*, in The 22nd Int. Conf. on Computational Linguistics (COLING) 2008.

Peter Chew, Philip Kegelmeyer, Brett Bader, and Ahmed Abdelali, *The Knowledge of Good and Evil: Multilingual Ideology Classification with PARAFAC2 and Machine Learning*, in The 9th International Conference on Intelligent Text Processing and Computational Linguistics (CICLing) 2008, also published in J. Language Forum, 2008.

J. Dan Morrow, Brett Bader, Peter Chew, and Ann Speed, *Ideological determination using small amounts of text*, in the International Studies Association 2008 Conference, 2008.

Brett W. Bader, Richard A. Harshman, and Tamara G. Kolda, *Temporal analysis of semantic graphs using ASALSAN*, in ICDM 2007: Proceedings of the 2007 IEEE International Conference on Data Mining, October 2007.

Brett W. Bader, Michael W. Berry, and Murray Browne, *Discussion tracking in Enron email using PARAFAC*, in Text Mining 2007, Workshop at the SIAM International Conference on Data Mining, April 2007.

Peter A. Chew, Brett W. Bader, Tamara G. Kolda, and Ahmed Abdelali, *Cross-language information retrieval using PARAFAC2*. In KDD 2007: Proceedings of the 13th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, pp. 143-152, August 2007.

Tamara G. Kolda and Brett W. Bader, *The TOPHITS model for higher-order web link analysis*, in Workshop on Link Analysis, Counterterrorism and Security at the SIAM International Conference on Data Mining, April 2006.

Karen Willcox, Omar Ghattas, Bart van Bloemen Waanders, and Brett Bader, *An Optimization framework for goal-oriented, model-based reduction of large-scale systems*. In Proceedings of the 44th IEEE Conference on Decision and Control, Seville, Spain, December 12-15, 2005.

Tamara G. Kolda, Brett W. Bader, and Joseph P. Kenny, *Higher-order web link analysis using multilinear algebra*, in ICDM 2005: The 5th IEEE International Conference on Data Mining, pp. 242-249, November 2005.

Book Chapters

Brett W. Bader and Peter A. Chew. Algebraic Techniques for Multilingual Document Clustering. In *Text Mining: Applications and Theory*, M. Berry and J. Kogan, eds. Wiley, 2010.

Brett W. Bader, Michael W. Berry, and Amy N. Langville. Text analysis using nonnegative matrix/tensor factorizations. In *Text Mining: Classification, Clustering, and Applications*, A. Srivastava and M. Sahami, eds. Taylor-Francis, 2009.

Brett W. Bader. Constrained and unconstrained optimization. In *Comprehensive Chemometrics, Volume 1*, Brown, Tauler, and Walczak, eds. Elsevier, 2009.

Brett W. Bader, Michael W. Berry, and Murray Browne. Discussion tracking in Enron email using PARAFAC. In *Survey of Text Mining II: Clustering, Classification, and Retrieval*, M. Berry and M. Castellanos, eds. Springer-Verlag, 2008.

Technical Reports

Philip Kegelmeyer et al. *Network Discovery, Characterization, and Prediction: A Grand Challenge LDRD Final Report*. Technical Report SAND2010-8715, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, December 2010.

Bernard D. Zak, Brett W. Bader, Ray Bambha, Mark B. E. Boslough, Hope A. Michelsen, and Matthew W. Moorman. *Reduction of Uncertainties in Remote Measurement of Emissions and Uptake of Greenhouse Gases*, Technical Report SAND2009-8244, Sandia National Laboratories. Albuquerque, NM, January 2010.

Peter Chew, Brett Bader, and Alla Rozovskaya. *Using DEDICOM for Completely Unsupervised Part-of-Speech Tagging*. Technical Report SAND2009-0842, Sandia National Laboratories. Albuquerque, NM, February 2009.

Charles Van Loan et al. *Future Directions in Tensor-Based Computation*, NSF Workshop report, May 2009.

Brett W. Bader, Travis L. Bauer, Chris Beers, Peter Chew, J. Dan Morrow, Nicholoas Pattengale, Ann Speed, Brian Titus, and Christina Warrender, *Determining ideology shifts from adversary text*. Technical Report SAND2008-6186, Sandia National Laboratories. Albuquerque, NM, September 2008.

Tamara G. Kolda and Brett W. Bader, *Multi-way Data Analysis and Applications*, in Proceedings of the 2008 Sandia Workshop on Data Mining and Data Analysis, J. M. Brandt, D. M. Dunlavy and A. C. Gentile (eds.), Technical Report SAND2008-6109, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, pp. 42-45, September 2008.

Brett W. Bader and Tamara G. Kolda, *Final Report: Data Mining on Attributed Relationship graphs*. Technical Report SAND2007-8018, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, December 2007.

Tamara G. Kolda and Brett W. Bader, *Tensor decompositions and applications*, Technical Report SAND2007-6702, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, November 2007.

Peter A. Chew, Brett W. Bader, Tamara G. Kolda, and Ahmed Abdelali, *Cross-language information retrieval using PARAFAC2*. Technical Report SAND2007-2706, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, May 2007.

Brett W. Bader, Richard A. Harshman, and Tamara G. Kolda, *Pattern analysis of directed graphs using DEDICOM: An application to Enron email*. Technical Report SAND2006-7744, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, December 2006.

Brett W. Bader and Tamara G. Kolda, *Efficient MATLAB computations with sparse and factored tensors*. Technical Report SAND2006-7592, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, December 2006.

Brett W. Bader, Richard A. Harshman, and Tamara G. Kolda, *Temporal analysis of social networks using three-way DEDICOM*. Technical Report SAND2006-2161, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, April 2006.

Brett W. Bader, Roger P. Pawlowski, and Tamara G. Kolda, *Robust large-scale parallel nonlinear solvers for simulations*. Technical Report SAND2005-6864, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, November 2005.

Tamara G. Kolda, Brett W. Bader, and Joseph P. Kenny, *Higher-order web link analysis using multilinear algebra*, Technical Report SAND2005-4548, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, July 2005.

Brett W. Bader and Tamara G. Kolda, *MATLAB tensor classes for fast algorithm prototyping*. Technical Report SAND2004-5187, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, October 2004.

Brett W. Bader and Tamara G. Kolda, *A Preliminary report on the development of MATLAB tensor classes for fast algorithm prototyping*. Technical Report SAND2004-3487, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, July 2004.

Brett W. Bader and Robert B. Schnabel, *On the performance of tensor methods for solving ill-conditioned problems*. Technical Report SAND2004-1944, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, September 2004.

Brett W. Bader, *Tensor-Krylov methods for solving large-scale systems of nonlinear equations*. Technical Report SAND2004-1837, Sandia National Laboratories. Albuquerque, NM and Livermore, CA, August 2004.

Software Packages

Tensor Toolbox (MATLAB) – Mathematical operations on multidimensional arrays for rapid prototype algorithm development of tensor decompositions (3,800+ registered users worldwide).

NOX (C++) – An object-oriented nonlinear equation solver package.

Conference and Workshop Presentations

Nontraditional Tensor Decompositions and Applications, SIAM Annual Meeting, Pittsburgh, PA, July 2010. (Invited Minisymposium Speaker.)

Large-scale Multilingual Document Clustering, SIAM Conference on Parallel Processing for Scientific Computing, SIAM Seattle, WA, February 2010. (Minisymposium Speaker.)

Advances in the Analysis of Asymmetric Data using DEDICOM, SIAM Annual Meeting, Denver, CO, July 2009. (Invited Minisymposium Speaker.)

Advances in Data Analysis using PARAFAC2 and Three-way DEDICOM, Three-way Methods in Chemistry

and Psychology (TRICAP), Spain, June, 2009. (Invited Speaker.)

Using DEDICOM for Completely Unsupervised Part-of-Speech Tagging, Workshop on Unsupervised and Minimally Supervised Learning of Lexical Semantics at the North American Association of Computational Linguistics, Human Language Technologies (NAACL-HLT) conference, 2009. (Accepted Paper Speaker.)

Algebraic Techniques for Multilingual Document Clustering, Text Mining 2009, Workshop at the SIAM International Conference on Data Mining, Reno, NV, May, 2009. (Invited Keynote Speaker.)

Unusual Tensor Decompositions for Informatics Applications, NSF Workshop: Future Directions of Tensor-based Computing and Modeling, National Science Foundation, Arlington, VA, February 2009. (Invited Speaker.)

Methods for Multilingual Text Analysis, SIAM Annual Meeting, San Diego, CA, July 2008. (Invited Minisymposium Speaker.)

Algebraic method for analyzing social networks and text documents, SIAM Annual Meeting, San Diego, CA, July 2008. (Invited Minisymposium Speaker.)

Temporal analysis of semantic graphs using ASALSAN, ICDM 2007: IEEE International Conference on Data Mining, October, 2007. (Accepted Paper Speaker.)

An overview of tensor decompositions and their applications, ICIAM 2007: 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, July, 2007. (Minisymposium Speaker.)

Discussion tracking in Enron email using PARAFAC, Text Mining 2007 Workshop at the SIAM International Conference on Data Mining, Minneapolis, MN, April, 2007. (Accepted Paper Speaker.)

Analysis of latent relationships in semantic graphs using DEDICOM, Workshop on Modern Massive Data Sets, Stanford/Yahoo!, June, 2006. (Invited Speaker.)

Improvements to three-way DEDICOM for applications in social network analysis, Three-way Methods in Chemistry and Psychology (TRICAP), Chania, Crete, Greece, June, 2006. (Invited Speaker.)

Extending graph analysis with multilinear algebra, Workshop on Tensor Decompositions and Applications, Marseille, France, September, 2005. (Invited Speaker.)

Solving nonlinear equations with tensor methods and block linear systems, SIAM Annual Meeting, New Orleans, LA, July 2005. (Speaker.)

MATLAB Tensor Classes for fast algorithm prototyping in multilinear algebra, 16th Householder Symposium on Numerical Linear Algebra, Seven Springs, PA, May, 2005. (Invited Speaker.)

Solving ill-conditioned problems using a technique from tensor methods, SIAM Computational Science and Engineering Conference, Orlando, FL, February 2005. (Speaker.)

A Tensor method for solving large systems of nonlinear equations, SIAM Annual Meeting, Portland, OR, July 2004. (Speaker.)

A Comparison of iterative tensor methods for solving large systems of nonlinear equations, 8th Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, March 2004. (Speaker.)

Tensor-Krylov methods for solving systems of nonlinear equations: An introduction and comparison, CASC

Nonlinear Solvers Workshop, Livermore, CA, August 2003. (Speaker.)

A Tensor-Krylov method for solving PDE problems, SIAM Computational Science and Engineering Conference, San Diego, CA, February 2003. (Speaker.)

A Tensor-Krylov method for solving large-scale systems of nonlinear equations, 7th Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, March 2002. (Speaker.)

Biasing Schemes for Generating Initial Iterates in Protein Folding, 6th Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, April 2000. (Speaker.)

Invited Seminars

Google, Mountain View, CA, January 2011.

Lawrence Livermore National Laboratory, Livermore, CA, January 2011.

Computer Science Tech Talk, MIT, Cambridge, MA, October, 2008.

Tensor methods for solving large-scale systems of nonlinear equations, Sandia National Laboratories, Livermore, CA, June 2002.

Patents

U.S. Patent Application No. 12/352,621 filed January 13, 2009, “Technique for Information Retrieval Using Enhanced Latent Semantic Analysis,” Peter Chew and Brett Bader.

Selected Awards and Honors

Recognition Award for outstanding service as acting manager, Sandia National Labs, 2010

Recognition Award for teaching at UNM, Sandia National Laboratories, 2010

Recognition Award for informatics prototype project, Sandia National Laboratories, 2009

Recognition Award in Data Mining Applications, Sandia National Laboratories, 2007

Von Neumann Postdoctoral Research Fellowship, Sandia National Laboratories, 2003-2005

Outstanding TA Award, Computer Science Department, University of Colorado, 2003

Hydrocarbons Technology Center Award, The Dow Chemical Company, 2000

J. Edward Vivian Award for exemplary performance in the MIT Practice School, 1996

Senior with Most Professional Promise in Chemical Engineering (awarded by MIT faculty), 1995

Dow Chemical Outstanding Junior Award in Chemical Engineering, MIT, 1994

Tau Beta Pi National Engineering Honor Society, MIT, 1993-1995

USRowing Collegiate Academic All-American, 1993

Dunbar Shanklin Undergraduate Award from MIT Chemical Engineering Department, 1993

Eagle Scout and Senior Patrol Leader, 1990

Service and Leadership

Program committee, Text Mining Workshop 2011, SIAM International Conference on Data Mining, 2011.

NSF proposal reviewer, 2010.

Referee for *IEEE Transactions on Parallel and Distributed Systems*, *Linear Algebra and its Applications*,

Numerical Algorithms, Journal of Selected Topics in Signal Processing, BIT Numerical Mathematics, 2010.
 Referee for *SIAM J. on Scientific Computing, Computational Optimization and Applications*, 2009.
 Referee for *SIAM J. Matrix Analysis and Applications, Applied Numerical Mathematics, Journal of Chemometrics*, 2008
 Referee for *Proceedings of National Academy of Sciences, SIAM J. Numerical Analysis, Applied Numerical Mathematics, Neural Computation, European J. of Operations Research*, 2007.
 Referee for *SIAM J. Matrix Analysis and Applications*, 2006
 Referee for *SIAM J. Optimization*, 2004 - 2005
 Referee for *Mathematical Programming and Numerical Algorithms*, 2001 – 2002
 Co-organizer of minisymposium, SIAM Annual Meeting, July 12-15, 2010.
 Organizer of minisymposium, SIAM Conference on Parallel Processing for Scientific Computing, Seattle, WA, February 24-26, 2010.
 Co-organizer of minisymposium, 6th International Congress on Industrial and Applied Mathematics (ICIAM 07), Zurich, Switzerland, July 16-20, 2007.
 Co-organizer of minisymposium, SIAM Conference on Computational Science and Engineering (CSE05), Orlando, FL, February 12-15, 2005.
 Teaching Assistant, Software Engineering Methods and Tools, Fall 2002
 Assistant Instructor in Boulder Mountaineering School, Colorado Mountain Club, Spring 2002
 Alpha Phi Omega National Service Organization, 2000-2003
 Assistant Coach of MIT Freshman Lightweight Crew, Fall 1995
 MIT Lightweight Crew, 1991-1995, Varsity Captain 1994-1995
 Tau Beta Pi National Engineering Honor Society, Corresponding Secretary, 1994
 Vice President of Dorm Living Group, 1993-1994
 U.S. Forest Service Trail Crew Volunteer, Summers 1990 and 1991